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A study of the excess gibbs energy of ribonuclease a - water mixtures

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Abstract

© 2014 by Nova Science Publishers, Inc. All rights reserved. Water sorption measurements were applied to characterize the hydration dependencies of the excess thermodynamic functions of binary protein-water mixtures. The aim of this study is to demonstrate how these quantities correlate with the coverage of the protein macromolecules by water molecules. The advantages of our methodology are (i) we are able to simultaneously determine the excess partial quantities of water and proteins; (ii) these thermodynamic quantities can be determined in the entire range of water content. Here, in particular, the excess Gibbs energies of the binary system of bovine pancreatic ribonuclease A (RNase A) with water were obtained as a function of composition at 25 °C. The results from the thermodynamic measurements were analysed to give a unified picture of the hydration process of proteins.

Keywords

Excess function, Gibbs energy, Partial quantity, Protein (biomacromolecule) hydration